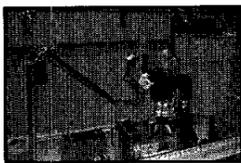




National Aeronautics and Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas



### Hubble helpers

Four space walkers have ambitious Hubble Space Telescope servicing objectives. Story on Page 3.



### Dear John

Mir Flight Engineer Jerry Linenger writes home to his 14-month-old son. Story on Page 4.

# Space News Roundup

Vol. 36

February 14, 1997

No. 7



Above: The first Texas longhorns to grace JSC pastures in more than 30 years leave their trailer and enter an 8-acre feedlot west of Rocket Park as JSC Director George Abbey and dignitaries from the Clear Creek Independent School District, the Houston Livestock Show and Rodeo's NASA-Clear Creek-Friendswood Metro Go Texan Subcommittee and the Texas Longhorn Breeders Association look on. Right: JSC Director George Abbey discusses the significance of the joint educational project during dedication ceremonies.

JSC Photos 97-01851 (top) by Karen Schmidt



## Longhorns take stock of new home

Aerospace workers, trail riders, educators dedicate project

Trail riders and aerospace workers stood side-by-side, between rockets and range cattle on Feb. 5 as the first two steers came out of the chute and into their new 60-acre Longhorn Project tract behind Rocket Park.

Almost 1,000 people attended the dedication for the educational project—a joint effort by JSC, the Clear Creek Independent School District and the Houston Livestock Show and Rodeo's NASA-Clear Creek-Friendswood Metro Go Texan Subcommittee. They were joined by 120 horses and riders and 10 wagons that made up the Texas Independence Trail Riders

who swung through the center on the way to this year's rodeo.

"I think it is going to be a great relationship with the Clear Creek independent school system," said JSC Director George Abbey. "Our people are very enthused about it, and I think the fact that it is really coming into being a real program now is a great thing."

John Wilson, superintendent of the Clear Creek Independent School District, said he believes the project, designed to give high school agriculture students first-hand experience with the latest in agricultural techniques and technology, will become a model for other projects around

the country.

"All this would not be possible if a lot of people had not come together," Wilson said. "I think this is a unique opportunity for agriculture, for students to have a world-class experience in the shadow of rockets - what better imagery could we want? It's an exciting project that we think can be available not only to the students in Clear Creek Independent School District, but other students in the Houston area."

John Baker, national director of the Texas Longhorn Breeders Association which arranged the

Please see **LONGHORN**, Page 4

## Discovery crew ready to service Hubble telescope

Astronauts Mark Lee and Steve Smith were expected to be wrapping up the first of four space walks planned for STS-82 this morning while Greg Harbaugh and Joe Tanner tried to get some rest before their Saturday space walk.

Discovery blasted off from Kennedy Space Center right on time at 2:55 a.m. CST Tuesday, arcing out over the Atlantic Ocean as their destination, the 12-ton Hubble Space Telescope, soared over central Africa at an altitude of about 320 statute miles.

"With a little luck in a couple of weeks, the best telescope in the universe will be even better than it is now," Commander Ken Bowersox said just before the pre-dawn launch.

As Bowersox and Pilot Scott "Doc" Horowitz maneuvered Discovery into position, Mission Specialist Steve Hawley was set to grapple the telescope with the shuttle's 50-foot-long robot arm at 2:16 a.m. Thursday, after more than three years since its last servicing and almost seven years since astronomer Hawley first deployed the orbiting observatory.

Hawley's next task was to lower the telescope onto its berthing platform and assure a good umbilical connection to the Flight Support System, which will provide electrical power for Hubble during its servicing.

Lee and Smith were scheduled to float out the hatch and into Discovery's cargo bay for the first space walk at 10:20 p.m. CST Thursday. Their first servicing task was to replace the Goddard High Resolution Spectrograph with the new Space Telescope Imaging Spectrograph, which is designed to extend Hubble's reach into the past by allowing it to look at the red-shifted light from stars and galaxies that formed just millions of years after the Big Bang, the theorized beginning of the universe.

Their next job was to remove the Faint Object Spectrograph and replace it with the Near Infrared Camera and Multi-Object Spectrometer, which will allow infrared imaging and limited spectroscopic observations of protostellar clouds, young star clusters and changes in planetary atmospheres over time.

JSC employees will be able to witness the Mission Control activities supporting the space walks. The MCC viewing room will be opened at 10:30 p.m. each space walk day, and the room will remain open for viewing as traffic warrants.

About 10:20 p.m. tonight, Harbaugh and Tanner are scheduled to begin the second extravehicular activity, replacing the faulty Fine Guidance Sensor and swapping out one of two Engineering and Science Tape Recorders.

The pair also is scheduled to install the Optical Control Electronics Enhancement Kit and remain in the payload bay while Bowersox and Horowitz conduct a 20-minute firing of the vernier reaction control system jets to begin reboosting Hubble into a higher orbit.

Saturday night, Lee and Smith will begin their second space walk, again about 10:20 p.m. Their tasks on the third space walk will be to replace the Data Interface Unit that routes data from the

Optical Telescope Assembly electronics to the telescope's command and telemetry system and to replace the second Engineering and Science Tape Recorder with a new Solid State Recorder.

Next, they will replace a faulty Reaction Wheel Assembly that is used by scientists to point the telescope, and hold on for another 20-minute reboost maneuver.

The final planned space walk is to begin about 10:20 p.m. Sunday when Tanner and Harbaugh step out of the airlock for the second time. They will replace the old Solar Array Drive Electronics with a new package and work through the slow process of connecting all of its electrical cables. Next, they will replace the Magnetic Sensing System covers with new, permanent covers.

Their last task with be to clean up the cargo bay, sit through another set of reboost thruster firings and make sure that ground controllers are able to remotely redeploy Hubble's High Gain Antenna.

Hawley is to redeploy Hubble at 11:55 p.m. Monday for another three years of observations until its next servicing in December 1999.

Discovery's landing is scheduled for 12:51 a.m. next Friday at KSC.



## JSC engineers help students 'Discover E'

By Mae Mangieri

Within days, some 225 JSC civil service and contractor employees will visit more than 350 classrooms to encourage students to pursue careers in engineering, science and technology as part of a national outreach program called Discover "E" ("E" for Engineering) during National Engineers Week.

On the national level, National Engineers Week is held from February 16-22, but JSC's program extends throughout February so workers have the opportunity to visit

as many classrooms as possible.

Although most of the volunteers include engineering and technical professionals, JSC employees, senior managers and retirees with other backgrounds also will visit classrooms.

Contractor employees will participate through the Education program's ongoing partnership with educational liaisons from nine contractor companies including Barrios Technology, Hernandez Engineering, Johnson Controls, Krug Life Sciences,

Please see **ENGINEERS**, Page 4



**ENGINEERS**  
Turning Ideas  
Into Reality.  
NATIONAL ENGINEERS WEEK,  
FEBRUARY 16-22, 1997



JSC Photo by Mae Mangieri

Jim Wade, an aerospace engineer in the International Space Station Independent Assessment Office, visits fourth and fifth graders at A.B. Freeman Elementary in the Pasadena Independent School District.

## Dailey to address JSC employees on planning initiatives

By Doug Peterson

NASA Deputy Administrator Jack Dailey will visit JSC on Feb. 25 to speak to employees about the management and planning initiatives under way across the agency.

Dailey will address all hands at 9 a.m. in Teague auditorium. The meeting will include comments from a senior Human Exploration and Development of Space representative and a short video about agency planning narrated by Walter Cronkite.

In a memo about the recently released NASA Strategic Management Handbook, Administrator

Please see **GOLDEN**, Page 4

JSC

# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

**Carnival tickets:** Houston Livestock Show and Rodeo carnival tickets, \$10.

**Moody Gardens:** Tickets are \$9.50 for 2 of 3 events.

**Space Center Houston:** Adult \$8.95; children (4-11) \$6.40, annual membership \$25.95, family membership (up to four) \$59.95.

**Movie discounts:** General Cinema, \$4.75; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75.

**JSC logo shirts:** Polo style, \$23. T-shirt, \$10.

**Stamps:** Book of 20, \$6.40.

**Orbit:** The book "Orbit" by Jay Apt, Mike Helfert and Justin Wilkinson is on sale for \$28.

**Metro tickets:** Passes, books and single tickets available.

JSC

# Gilruth Center News

**Sign up policy:** All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a yellow EAA badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

**EAA badges:** Required for use of the Gilruth Center. Employees, spouses eligible dependents, NASA retirees and spouses and may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 9 a.m.-1 p.m. Saturdays. Cost is \$10. Dependents must be between 16 and 23 years old.

**Hatha Yoga:** A stress relieving, stretching and breathing exercise routine to unite body, mind and spirit. Classes meet from 5:30-6:30 p.m. Thursdays. Cost is \$40 for eight weeks.

**Nutrition intervention program:** A six-week program to learn more about the role diet and nutrition play in health, including lectures, private consultations with a dietitian and blood analysis. Program is open to all employees, contractors and spouses. For more information call Tammie Shaw at x32980.

**Defensive driving:** One-day course is offered once a month. Pre-registration required. Cost is \$25.

**Stamp club:** Meets at 7 p.m. every second and fourth Monday in Rm. 216.

**Weight safety:** Required course for employees wishing to use the weight room will be offered from 8-9:30 p.m. Feb. 25. Pre-registration is required. Cost is \$5. Annual weight room use fee is \$90. Additional family members are \$50.

**Exercise:** Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24 for six weeks.

**Aikido:** Martial arts class meets from 5:15-6:15 p.m. Tuesday and Wednesday. Cost is \$35 per month. New classes begin the first of each month.

**Aerobics:** Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

**Ballroom dancing:** Beginner classes meet from 7-8:15 p.m. Thursdays. Intermediate and advanced classes meet from 8:15-9:30 p.m. Cost is \$60 per couple.

**Country and Western dancing:** Beginner class meets 7-8:30 p.m. Monday. Advanced class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

**Fitness program:** Health Related Fitness Program includes a medical screening examination and a 12-week individually prescribed exercise program. For more information call Larry Wier at x30301.

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# Dates & Data

## Today

**Astronomers meet:** The JSC Astronomical Society will meet at 7:30 p.m. Feb. 14 at the Lunar and Planetary Institute, 3600 Bay Area Blvd. For more information call Chuck Shaw at x35416.

**STS-82 viewing:** The Mission Control viewing room will open at 10:30 p.m. Feb. 14 so employees may view space walking activities during STS-82. The viewing room will remain open until the end of the EVA if attendance warrants. Call the Employee Information Service at x36765 for the latest schedule.

**Cafeteria menu:** Special: baked chicken. Total Health: roast beef au jus. Entrees: deviled crab, baked chicken, beef cannelloni, steamed pollock, Reuben sandwich. Soup: seafood gumbo. Vegetables: seasoned carrots, peas, breaded okra, steamed cauliflower.

## Saturday

**NTA meets:** The National Technical Association will meet at 10 a.m. Feb. 15 at Texas Southern University School of Technology, Rm. 316. For more information call Pam Denkins at x35272.

**STS-82 viewing:** The Mission Control viewing room will open at 10:30 p.m. Feb. 15 so employees may view space walking activities during STS-82.

## Sunday

**STS-82 viewing:** The Mission Control viewing room will open at 10:30 p.m. Feb. 16 so employees may view space walking activities during STS-82.

## Monday

**Federal holiday:** Most JSC offices will be closed in observance of President's Day.

**STS-82 viewing:** The Mission Control viewing room will open at 8 p.m. Feb. 17 so employees may view the Hubble Space Telescope release during STS-82.

## Tuesday

**STS-82 viewing:** The Mission Control viewing room will be open

from 5-7 p.m. Feb. 18 so employees may view STS-82 activities.

**Cafeteria menu:** Special: turkey and dressing. Total Health: roast turkey. Entrees: barbecue spare ribs, liver and onions, baked chicken, steamed fish French dip sandwich. Soup: black bean and rice. Vegetables: steamed broccoli, California vegetables, breaded squash, savory dressing.

## Wednesday

**Spaceland Toastmasters meet:** The Spaceland Toastmasters will meet at 7 a.m. Feb. 19 at the House of Prayer Lutheran Church. For details call Jeannette Kirinich at x45752.

**Spaceteam Toastmasters meet:** The Spaceteam Toastmasters will meet at 11:30 a.m. Feb. 19 at United Space Alliance, 600 Gemini. For details call Pat Blackwell at 282-4302 or Ben Black at 282-4166.

**Astronomy seminar:** The JSC Astronomy Seminar will be held at noon Feb. 19 in Bldg. 31 Rm. 129. An open discussion meeting is planned. For details call Al Jackson at x35037.

**STS-82 viewing:** The Mission Control viewing room will be open from 4:30-6:30 p.m. Feb. 19 so employees may view STS-82 activities.

**Scuba club meets:** The Lunarfins will meet at 7:30 p.m. Feb. 19 at the Sundance Grill inside the Seabrook Shipyard. For more information call Fred Toole at x33201.

**Cafeteria menu:** Special: Mexican dinner. Total Health: ground turkey tacos. Entrees: beef cannelloni, turkey tacos, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: peas and carrots, ranch beans, mustard greens, Spanish rice.

## Thursday

**Cholesterol check:** The JSC Clinic will offer cholesterol profiles Feb. 20 to employees who are not normally scheduled for physicals. Call the clinic at x34111 for instructions and an appointment.

**Directors meet:** The Space Family Education board of directors will meet at 11:30 a.m. Feb. 20 in Bldg. 45 Rm. 712D. For more information on this open meeting call Gretchen Thomas at x37664.

**Diet seminar:** The JSC Total Health Program will sponsor a diet seminar from 11:30 a.m.-12:30 p.m. Feb. 20 in Bldg. 30 Auditorium. Rebecca Reeves will discuss "The Truth about Diet Pills." For more information call Larry Wier at x30301.

**IEEE meets:** The Institute of Electrical and Electronics Engineers, Galveston Bay Section will meet at 11:30 a.m. Feb. 20 at the Gilruth Center. Graham O'Neil will discuss "Search for Water in the Solar System." For reservations, call Charlotte Garner 333-6131.

**STS-82 viewing:** The Mission Control viewing room will be open from 4:30-6:30 p.m. Feb. 20 so employees may view STS-82 activities.

**Cafeteria menu:** Special: smothered steak. Total Health: steamed pollock. Entrees: chicken and dumplings, corned beef and cabbage, broccoli cheese quiche, steamed fish, French dip sandwich. Soup: navy bean soup. Vegetables: steamed cabbage, cauliflower au gratin, buttered carrots, lima beans.

## Friday

**Cholesterol check:** The JSC Clinic will offer cholesterol profiles Feb. 21 to employees who are not normally scheduled for physicals. Call the clinic at x34111 for instructions and an appointment.

**Golf applications due:** Applications are due Feb. 21 to the JSC Golf Association. For more information call Bob Sampson at x34962.

**Cafeteria menu:** Special: baked meatloaf. Total Health: baked potato. Entrees: chicken fajitas, ham steak, pork and beef eggrolls, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: stewed tomatoes, seasoned spinach, cut corn, macaroni and cheese.

# Swap Shop

## Property

Sale: Taylorcrest, 1-1-1, very clean, balcony, tennis court, \$27k. Mike, 281-333-4760 or 281-486-6034.

Sale/Rent: Tranquility Lake, 1 BR condo, W/D, FPL, \$39k or \$440/mo. Bill, x31167 or 333-9042.

Rent: Countryside South, 2-2-2, gazebo porch, fenced yard w/trees, FPL, ceiling fans, all appliances furnished, lawnmower and summer lawn service, \$775/mo + dep. 480-8101 x559 or 992-9967.

Rent: East Seabrook area, 1-1 upstairs apt overlooking pond, attic storage, porch area, avail 1/1/97, \$480/mo + 200 dep. 281-474-2523.

Rent: Lake Travis cabin, private boat dock, cent A/C and heat, equipped, accommodates 8, spring/summer \$550/wk, \$120/day. 474-4922.

Rent: Arkansas cottage, fully furnished, massive FPL, \$50/day of \$250/wk. Corcoran, x47806.

Sale/Lease: University Trace Condo, 1 BR plus study, 1 1/3 baths, W/D, cov parking, \$33k, \$525/mo. x48621 or 480-2417.

Rent: Jamaica Beach West Galveston, beach house, 2nd row on beach, great view, all amenities, sleeps 7, winter rates. 488-6796.

Rent: Blackcomb, British Columbia, 2-2 condo, #1 ski resort in NA, W/D, kitchen, heated pool, avail 3-16 to 3-23, 8 days 7 nights, \$200 per night. 998-0659.

Sale: Nassau Bay, Queen's Court Townhouse, 3-2.5-2, \$87.5k. 333-4286.

Sale: Heritage Park Friendswood, 3-2-2, ex cond, sec sys, ceramic tiles, \$81.9k. 996-0152.

## Cars & Trucks

'85 Chevy Blazer, blue, low mi, good cond, '97 inspection, \$3k. Julia, x40251 or 488-2771.

'88 Red Nissan Sentra, AC, PS, PB, \$950 obo. 527-8379.

'92 Nissan Maxima SE, dark gray, 64k mi, leather, CD, sunroof, pwr locks/windows, cruise control, ex cond, \$13.5k. 326-6228.

'85 Ford F-150 Supercab, 5.0 V8, captain's chairs, new rear tires, runs good, \$3.2k. James, 333-6188.

'84 Ford F150 XLT 4WD, 351 ci, AC, cruise, top-per, 8' bed, 150k mi, good cond, \$2.8k. x49744 or 281-538-4416.

'92 Chevy Silverado PU, ex cond, ext cab, towing pkg, white w/red int, \$12.6k. 333-7281 or 334-1882.

'85 Chevy Cavalier, 4 dr, good tires, new battery, low mi, ex running car, \$1.8k. Judy, x38674.

'91 Chevy Beretta, AC, PS, 5 spd, AM/FM, clean, \$3.9k. 326-4447.

'87 Chevy Celebrity 2 dr, maroon, new paint, w/ matching int, AC, AM/FM/cass, ex cond, \$3.2k. 944-9267.

'93 Chevy Cavalier, 4 dr, take over payments, owe \$6.5k. 281-8759.

'94 Chevy Camaro, 13.5k mi, ex cond, T-top, pwr lock/windows/seat, cruise, custom wheels, Bose stereo, blue, \$15.3k. x31838 or 480-4226.

'95 Eagle Talon Tsi AWD, black, loaded, turbo, 210 hp, sunroof, leather, 8 speakers, alarm, warranty, 24k mi, ABS, \$18.5k obo. Jim, x31168 or 281-333-8439.

'95 Trans Am, 100k mi, trans warranty, 27k mi, loaded, leather int, AM/FM/CD, T-tops, blue green chameleon, \$19.5k obo. 337-4360.

'94 Honda Accord LX, ex cond, 29.5k mi, 4 cyl, white ext, auto, 4 dr, dual airbags, loaded, AM/FM/cass/CD, \$14.8k obo. Gus, x33425 or 286-4402.

'84 Cadillac Sedan DeVille, good AC, brakes, tires, V8, \$1.5k obo; '72 Olds Delta 88, good tires, brakes, road worthy, best offer. 281-461-0944.

'83 Mercedes 380SL, silver, 2 tops, 109k mi, \$12.5k. 326-2557.

'85 Audi 4000S, 4 dr, auto, silver, A/C, AM/FM/cass, approx 60k mi, ex cond, \$3.6k. Bobby, 244-2444 or 488-4382.

'93 Saturn SL2, loaded, low mi, ex cond, auto, black, \$9.5k. 283-5514 or 286-6941.

'93 Chevy Camaro Z-28, 6 spd, ex cond, warr, 47k mi, CD, pwr locks, seat and windows, cruise, custom wheels, black, \$13.3k. x34544 or 326-3759.

'87 GMC Safari minivan, burgundy, int and tires one yr old, body and engine ex cond, \$4.5k. Teena or Walt, x37787 or 281-422-6369.

'92 Chevy Suburban Silverado, loaded, ex cond, white w/maroon int, 120k mi, \$15.1k. Tom, x40048 or 334-2593.

'84 Corvette, white w/red int, 84k mi, loaded, auto, leather, new A/C and many other parts, 2nd owner, \$8.9k. Jeff, x41947 or 281-286-6785.

'81 Chevrolet Silverado, \$3k obo. James, 337-5583.

'84 Dodge Prosepector van, sleeps 2, mag wheels, stereo, dual A/C, new interior, \$1,950. Rich, x33222 or 538-2870.

## Cycles

Ladies' 19" Peugeot bicycle, 12 spd, racing w/roll handlebars, \$40. Vicki, 283-0278 or 335-1286.

'96 Harley Davidson Sportster Huggler, less than 1k mi, extra chrome/windshield/leather seat, midnight blue, garaged, \$8.7k. 244-1791 or 488-1326.

Dyno VFR boy's bike, \$70 obo. 480-8101 x559 or 996-8016.

## Boats & Planes

16' Ebbtide bass boat, 115 hp Johnson, less than 30 hrs, plus many extras, \$4k obo. Greg, x32083 or 281-485-4922.

16' Hobie Cat w/trailer, new rope and hardware, \$900/both. 244-6207 or 281-339-0752.

'97 Citabria 7GCBC (explorer), Lyc. 160 hp, full gyro pkg, NAV/COM, many extras, \$60/hr. x38879 or 281-482-8213.

'95 16' Alumacraft, '94 50 hp Mercury; '95 galv Sportsman, live well, trolling motor, compass, depth finder, \$8.3. Charlie, 480-4046.

Outboard engine, 8.0 Hp Evinrude long shaft, \$450. Robert, 334-1677 or 717-8231.

Aluminum prop from 21' Mercruiser I/O 135 hp engine, \$50; tire for boat trailer w/rim, unused, \$50.

Robert, x37739.

'89 Maxum 17' bowrider, 85 hp Force O/B, ski rail, galv trailer, custom cover, \$4k obo. Mike, x33898 or 488-0700.

One half ownership in 28' Pearson sailboat, Clear Lake, 3 sails, spinnaker, 30 hp I/B Atomic 4 eng, \$5k plus \$100/mo maint/slip fee. 244-7806 or 538-1681.

'87 Executive Cruiser pontoon boat, 115 O/B, stereo, canopy, power trim, trailer, Hummingbird depth and fish finder, like new, \$6.2k. Rich, x33222 or 538-2870.

## Audiovisual & Computers

Escort Solo5 laser/radar detector, cordless, w/case, unused, \$120. 488-9080 x3688 or 334-4411.

Super Nintendo games, NFL football, \$20; Scooby Doo, \$25; computer CD ROM game Elroy Goes Bugzer, \$15; child's bicycle seat, up to 40 lbs; B&D Dustbuster, \$15. X37130.

Stereo equipment, Calibre 240 AM/FM receiver and amplifier, \$75; Onkyo cassette tape deck, 4100; Sony CDP-37 CD player, \$100. 326-2187.

Hyundai 286/10 PC, 640k+, 65MB stacked, 121 EGA amber, 1.2 MB HD, modem, mouse, kybd, orig disk/manuals, S/W, \$150. 282-3650.

Color computer monitor, 15", flat screen, \$50. Jeremy Jacobs, x35906 or 480-9208.

Epson Color Stylus II blk ink cartridge, 2 at \$5 ea. 326-2294.

Ten ft dia solid satellite dish and electronics, I.O. Prism satellite recvr w/descrambler disk, remote arm needs replacement, \$500. Russ, x45989 or 332-1769.

Fujitsu high speed scanner, grayscale, \$850 obo; Kodak CD ROM writer, like new, was \$5k, now \$800 obo. x32920 or 992-9203.

RCA 52" big screen TV, 5 yrs old, was \$2k, now \$1k. James, 337-5583.

## Pets & Livestock

Mini-Rex rabbits, \$10 ea. 482-0874.

Ostriches, 4 mo old, healthy red blue cross, \$150, x38200 or 534-3306.

Two miniature horses, 2 yr old stallion, 32" dappled gray, \$1,250; 3 yr old mare 30" bay, \$750, both registered w/AMHA. J B Williamson, 281-356-3991.

## Lost & Found

Lost: Grey neutered male rabbit answers to Miller, approx 4 yrs old. Lost in Bay Glen subdivision on 1/25/97. Reward if found. x48133 or 281-480-1266.

## Household

Electric washer, working but needs work, \$50; dining table, \$100. 482-0874.

Sofa and love seat, ex cond, best offer. 486-7909.

Apt sz Whirlpool washer/dryer, \$100 obo. 281-461-9539.

Clayton-Marcus country/colonial sofa, cream background, light blue and mauve accents, 4 yrs old, \$275 obo. 480-8101 x559 or 992-9967.

Toddler bed, mattress, sheets, \$30. 409-943-4168.

Antique solid wood desk, 60"x34"x31" tall, \$200, 538-3190.

Five piece master bedroom set, qn sz headboard, night stands, dresser and mirror, very good cond, \$250 obo. Louis, 335-8676.

Two 5 caster office chairs, gray fabric/black frame, pneumatic height adjustment, back angle and ht, seat tile, arms, was \$200, now \$50 ea OBO. 488-9080 x3688 or 334-4411.

Solid wood 7 drawer dresser, mirror, ex cond, \$150; vacuum cleaner, \$30. X40037 or 482-6126.

Black digital large capacity washer and gas dryer, \$600 obo; full sz futon, quality mattress, \$250; Sony stereo 5 CD remote, \$400. Martha, 281-992-3119.

Cherry wood veneer dining table w/4 chairs, \$500 obo; stereo cabinet, \$20. X36185 or 286-2174.

Dark blue sofa, 87", \$100. Tom, x40048 or 334-2593.

Super Single water bed, \$100 obo. 488-5416.

Ethan Allen entertainment center, \$600; Bassett living room set w/qn sleeping sofa, \$1.1k; GE refrig, 22.5 cu ft, \$300; Kenmore W/D, \$250/set; oval solid wood table w/ex leaves, 6 chairs, \$900. 996-0152.

## Wanted

Want old Macintosh computers, cheap. David, 244-4203.

Want mature female to share expense of 3-2-2 house w/owner, no pets, non smpk, \$400/mo plus \$200 deposit. 484-8640.

Want used modems or CD ROMs, will buy your low-tech modem or CD ROM. Lee, x47233 or 474-3176.

Want roommates to share large 3 BR house in Heritage Park, 2 car garage and storage space available, \$300/mo, male or female. 281-283-6918 or 281-996-8756.

Want home, condo, or multifamily, no approval assumption and/or owner finance, any condition. 482-0874.

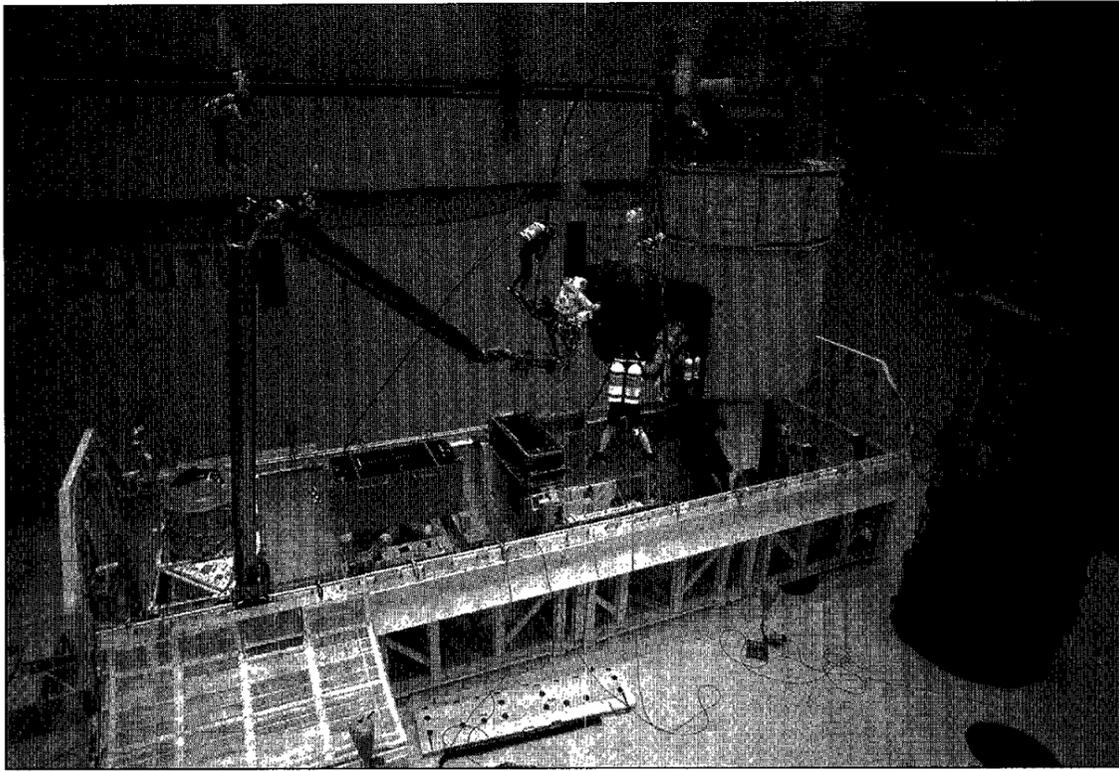
Scuba equipment, 2 pair fins, \$25/\$20; 1 pair small gloves, \$20; 1 Hawaiian sling hand spear, Phonemate ans machine w/Feature Phone, \$55. 480-3424.

Skis, K2 extreme w/Salomon bindings, 180 length, \$275; Reebok step and video, \$45; Olympus OM2S camera w/flash and several lenses, \$350; basketball goal, \$10. 326-6228.

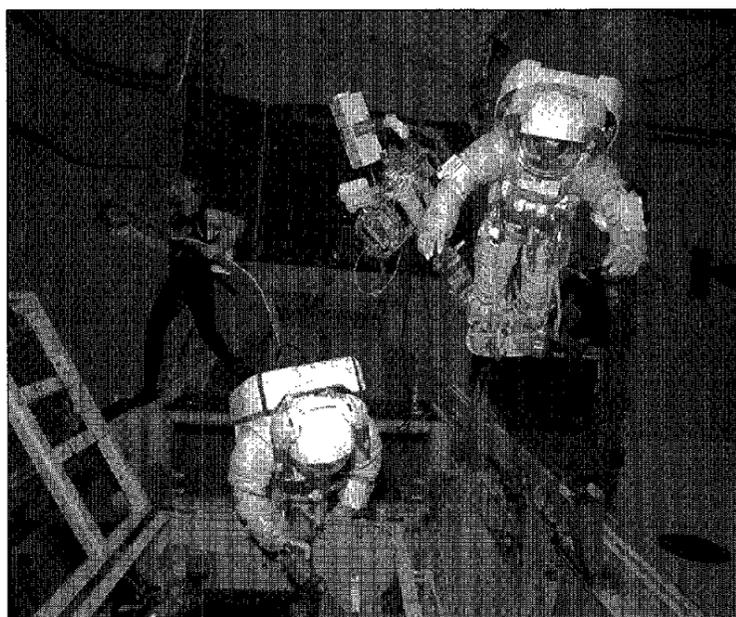
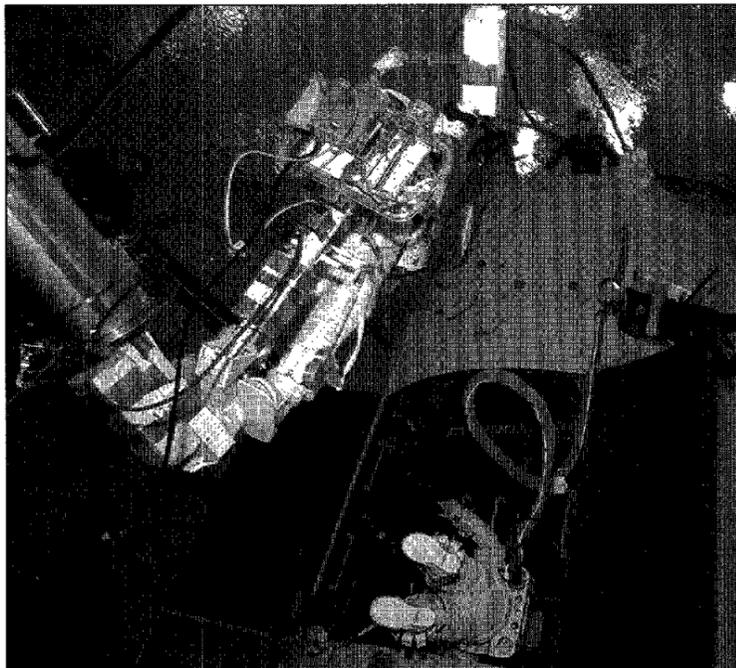
Coit Sporter Competition HBAR w/scope, removable rear sight, .223 cal, fired about 100 times, \$1.5k. 281-388-2761.

Wedding dress, sz 6, traditional white satin with a jewel V neckline, designed w/chantilly lace encrusted w/crystals and pearls, long tapered sleeves, semi-cathedral bustled train, \$400. 474-3506.

Golf cart, three wheel, electric w/charger, runs and looks excellent, \$600 obo. Russell, 713-668-2044.



From top to bottom: 1) In the new Neutral Buoyancy Laboratory at the Sonny Carter Training Facility the STS-82 astronauts practiced the procedures they will use during their space walks when servicing the Hubble Space Telescope. 2) Payload Commander Mark Lee practices installing a unit similar to the Space Telescope Imaging Spectrograph and the Near Infrared Camera and Multi-Object Spectrometer, or NICMOS. 3) Astronaut Jeff Hoffman, on the robot arm, helps train Lee on installation and connection procedures. This box is similar to the type of box that Story Musgrave changed out on STS-61, only more user friendly. It has a number of deconnectors and the challenge for the astronauts is to move each connector and mate it up with a connector keeper on the new box without losing the little screws. 4) Before the astronauts can install the new instruments, they must remove them from their stored position, in *Discovery's* cargo bay. Tanner shows Lee how best to handle the unpacking of the instruments.



JSC Photos By Robert Markowitz

# Space Service

## Four mechanics give Hubble 450 million mile service check

By Karen Schmidt

**A** crew of seven are scheduled to set out on a journey this week to help expand the knowledge of what lays beyond Earth's own galaxy.

The Hubble Space Telescope once again will be captured by astronauts and refurbished to extend the orbiting telescope's life and enhance its capabilities.

"The prime goal of this second servicing mission is a major upgrade and an extension of the science on Hubble," said Ed Weiler, chief scientist for Hubble. "We are replacing 1970s technology in our science instruments with 1990s technology."

In four space walks Mission Specialists Mark Lee, Greg Harbaugh, Steve Smith and Joe Tanner will remove two older astronomy instruments and install new ones. The Near Infrared Camera and Multi-Object Spectrometer, or NICMOS, will improve how astronomers determine distance to galaxies and provide images of star formation and obscured galactic centers.

"The NICMOS will provide images of the near infrared for the first time. It will fill the gap between Hubble's capabilities and the capabilities on the Space Infrared Telescope Facility, the last of the great observatories, to be launched in 2002," said Weiler. "For the first time we will have the capability to observe the universe all the way from the ultraviolet with Hubble through the mid and far infrared with SIRTIF."

The Space Telescope Imaging Spectrograph will provide a new two-dimensional capability to Hubble's spectroscopy. This new spectrograph also will cover a broader wavelength range and has improved sensitivity. Hubble also will receive a refurbished guidance sensor, a new pointing device and service to its support systems and new recorders.

Commander Ken Bowersox, Pilot Scott Horowitz, Mission Specialist Steve Hawley and space walkers Lee, Smith, Tanner and Harbaugh have trained long hours to service Hubble.

Once Bowersox and Horowitz maneuver *Discovery* into place, Hawley is scheduled to use the robot arm Thursday to grapple and berth Hubble in the cargo bay.

Space-walking activities were scheduled to begin today with Lee and Smith.

"Once we berth the Hubble Space Telescope, on its berthing and position ring we are going to put in a stem that goes from the bottom of the flight servicing structure up to the ring that rotates to give a little more rigidity to the whole structure," Lee said. "This is our opportunity to make sure we have a real steady platform to work from. Once we do that, we will do a lot of other initial setups."

After Lee and Smith set up the cargo bay, the two space walkers will remove the Goddard High Resolution Spectrometer and

replace it with the Space Telescope Imaging Spectrograph. Next, the team will focus on removal of the Faint Object Spectrograph and will install the NICMOS.

"That will take up most of day one. If we get a little bit ahead, we hope to move up the reaction wheel assembly. The more we can get done on days one and two, the less filled days three and four will be. It will give us a little more margin," Lee added.

On flight day five, Harbaugh and Tanner will emerge from *Discovery's* airlock to begin their work on the replacement of the fine guidance sensor, the engineering/science tape recorder and the optical control electronics enhancement kit.

"I will be on the end of the arm and Greg will be the free-floater," said Tanner. "He does the connectors and provides clearance for me and I get to demate the latch that holds the FGS in place and handle the mass. After we finish that task, we will go in and replace the tape recorder. We will

then swap positions and Greg will get on the end of the arm and I will be the free-floater. Greg will install an enhancement kit for the optical control electronics."

With the work half over, Lee and Smith will emerge for a third space walk. Smith will be the free-floater and retrieve the data interface unit from a storage box in *Discovery's* cargo bay and hand the unit to Lee for installation into Hubble.

"The unit Mark will take out has about 20 connectors," said Smith. "So, we think it will be one of the more difficult hand intensive tasks we have to do."

Smith and Lee once again will switch places and replace another tape recorder with a new solid state recorder. If Smith and Lee were unable to install the reaction wheel assembly on their first space walk, they will complete that task before moving on to replace Magnetic Sensing System covers.

"That task is near the top of the telescope and it is a task we all look forward to doing, so if we don't do it on day three, Greg and Joe will do it on day four," he added.

The final space walk of the mission will replace Hubble's solar array drive electronics box. This box helps control the movement of the solar arrays on the telescope.

"It is the same type of box that Story Musgrave changed out on STS-61, only this time around we think we've got it engineered a little bit more user friendly," Harbaugh said. "It has a number of deconnectors. The challenge is going to be for Joe and me to move each of those connectors and mate it up with a connector keeper on the new box without losing those little screws."

Once work is complete Hawley will deploy the telescope into space where it can continue to explore the mysteries of the universe.

*Discovery* is scheduled to return in the wee hours of Feb. 21. □



# Linenger writes home; Soyuz docks with Mir

Two Russian cosmonauts and a German cosmonaut researcher docked their Soyuz TM-25 spacecraft with the Mir Space Station on Wednesday, bringing American Jerry Linenger's new crew mates.

Docking occurred on time at 9:52 a.m. CST, and television cameras beamed pictures of the hatch opening and welcome ceremonies back to Earth 90 minutes later.

Mir 23 Commander Vasily Tsibliev, Flight Engineer Alexander Lazutkin and Cosmonaut Researcher Reinhold Ewald launched from the Baikonur Cosmodrome in Kazakhstan at 8:09 a.m. JSC time

Monday. When Discovery lifted off early Tuesday with its seven crew members, the three spacecraft tied the record for the most human beings in orbit at one time at 13.

The Mir 23 crew will spend three weeks aboard the orbiting laboratory with Mir 22 Commander Valery Korzun and Flight Engineers Alexander Kaleri and Linenger. Then, Korzun, Kaleri and Ewald—who will have completed his three weeks of microgravity experiments—will return to Earth, leaving Tsibliev, Lazutkin and Linenger on the space station.

Linenger and his Mir 22 crew

mates spent the days preceding the Mir 23 crew's arrival making preparations to house six people aboard the decade-old space station and undocking a Progress vehicle to make room for the upcoming Soyuz spacecraft.

Once the Mir 23 crew bids the cosmonauts and German researcher farewell, the station's occupants will turn their attentions toward a March space walk by Linenger and Tsibliev, the first involving an American crew member using a Russian space suit.

Linenger also is taking time to pen letters home to his 14-month-old

son, and has asked that they be shared with the world on the Internet. The first letter includes these passages:

"I decided before this flight that I was going to be a good father and write to you every day. This is my first attempt at that. I realize that you are only one year old, and although I exaggerate your talents like any proud father would, I don't think that you can quite read this yet. No problem. When you can, you'll feel good knowing that your father loves you.

"Space flight is a dangerous business," Linenger continued. "I used to

be pretty cavalier about it. But just before this launch, I started questioning what I was about to do. You see, I have so, so much to lose now. You and your mother...."

"You know, although I am up here floating above the Earth, I am still an earthling. I feel the pain of separation, the pride of a father, and the loneliness of a husband away from his wife like an earthling. And maybe even a bit more acutely," he finished.

For the complete text of the letters, visit the NASA Shuttle-Mir Web at:

<http://shuttle-mir.nasa.gov>

## Advanced life support test surpasses 30 days

By Linda Copley

A four-person team living in a special air-tight chamber at JSC has reached the half-way point of its planned 60-day test of recyclable life support systems that will be used for future space ventures.

The team, participating in the Phase IIA-International Space Station Life Support Test—the third in a series of tests being conducted at JSC that use physicochemical and biological methods to recycle air and water—reached the 30-day mark at 10 a.m. Wednesday. The four-person volunteer crew entered the three-story 20-foot diameter chamber on Jan. 13 to spend up to 60 days investigating the use of mechanical and chemical means to recycle all air and water, including urine, for the volunteers. These physicochemical air and water processors are the same types that will be used on board the International Space Station.

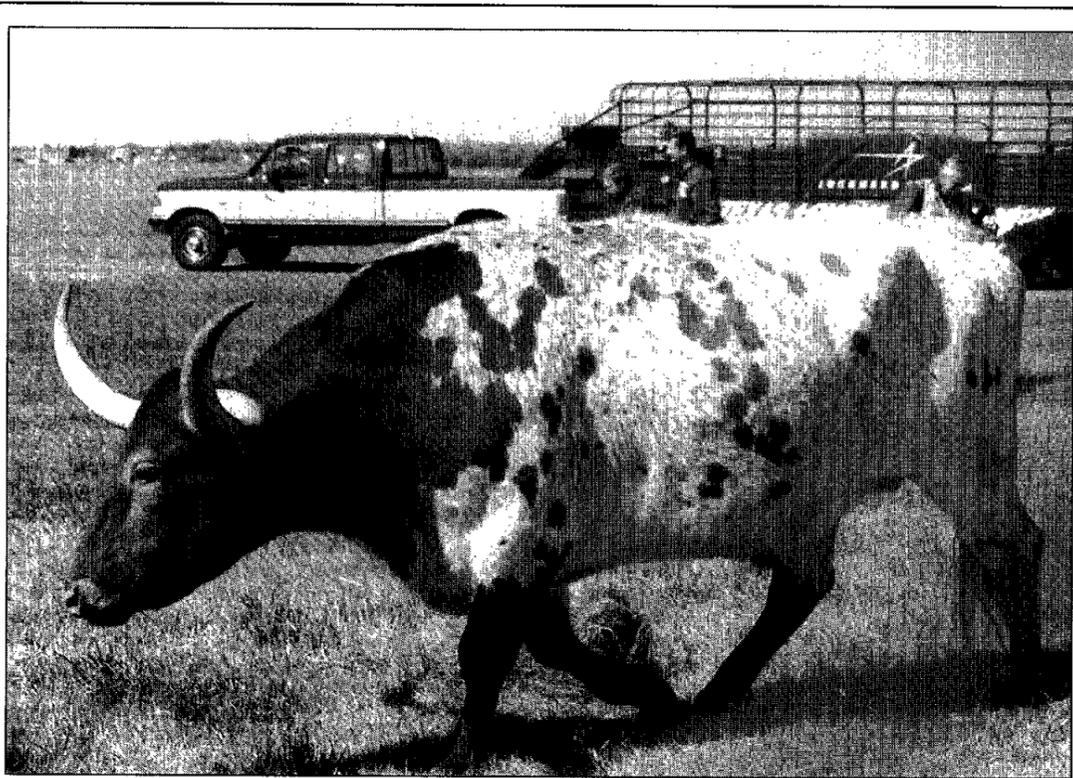
The test crew members are Crew Leader Terry Tri (35, JSC Project Manager, Bioregenerative Life Support Systems Complex); Karen Meyers (33, Lockheed Martin

Project Engineer); Fred Smith (31, JSC Systems Engineer); and Dave Staat (26, Lockheed Martin Facilities Project Engineer). The quartet plans to remain in the chamber until March 14 to evaluate the effectiveness of the International Space Station regenerative life support systems.

The current test employs mechanical and chemical systems that are functionally the same as those to be used on the International Space Station. Team members provide daily status reports on the operation of the air revitalization and water recovery systems, as well as crew habitability criteria. The team also is evaluating other planned International Space Station activities including medical, food systems, and specialized shifts for staffing monitoring consoles in the control room.

Employees may access additional information about the test at the following website address: [http://pet.jsc.nasa.gov/chamber\\_test/](http://pet.jsc.nasa.gov/chamber_test/)

A news conference with the Advanced Life Support management team and test chamber crew is scheduled for 10 a.m. March 4 on NASA Television.



JSC Photo by Karen Schmidt

**HOME ON THE RANGE**—One of two longhorn steers delivered to its new JSC feedlot Wednesday struts its stuff for about 1,000 people who attended the Longhorn Project dedication ceremonies. The two steers are expected to be joined by three heifers, and all five will be taken care of by area high school students.

## Longhorn Project blazing new frontiers in education

(Continued from Page 1)

donation of two steers and three heifers from longhorn breeders in several states, said he considered it a privilege to participate in the consortium.

"This project is blazing a new frontier with NASA continuing to explore the frontiers of space, the Clear Creek ISD blazing the frontiers of education for our youth, the Houston Livestock Show and Rodeo, which is the leader in the nation at creating frontiers in livestock shows and rodeos, and the Texas Longhorn Breeders Association, which has preserved and protected these Texas longhorn cattle," Baker said. "We are pleased to be a participant and to work hand-in-hand with each of you in this project. We look forward to a long-term relationship for the benefit of youth, NASA and others around the world."

The Longhorn Project came to fruition in six quick months as JSC,

its employees, local industry and members of the community came together to formulate and execute the plan.

"This is really just the first step with the longhorns," Abbey said, "because we're going to have aquaponics and orchards here on the center and we'll have an opportunity to participate with the students in those programs."

The first two steers were herded into the feedlot shortly after volunteers from Johnson Controls World Services put finishing touches on the first building structure, a 20-by-40-foot barn. The materials were donated to the Clear Creek Independent School District by Johnson Controls, and volunteers organized by Bill Shelton built the structure over a period of two weekends.

"Our next order of business is to extend water and electrical service to the project," said Don Holick, project manager for the Center

Operations Directorate. "We have had an excellent response to the Longhorn Project by both Clear Lake and Houston businesses. Centennial Contractors Enterprises Inc. has donated the electrical installation and Warren Electric Co. has donated the electrical materials. T.M. Gryphon Inc. has donated the water line materials and installation. Dow Fence & Supply has just finished the fence around the 8-acre feedlot and the 35-acre pasture. Cost of the fences was underwritten by the Houston Livestock Show and Rodeo through its NASA-Clear Creek-Friendswood Metro Go Texan Subcommittee."

J.D. Abrams Inc., which is working on the NASA Road 1 widening project, donated the roads and building pads for the structures; Nations Bank/West University Branch and Lockheed-Martin endowed the Longhorn Fund with cash donations, and Harvest Fresh Seafoods Inc.

provided technical support.

"We still need two portable buildings about 10-by-20-feet and a 15-by-20-foot greenhouse to complete the structures requirements of the project," said Holick. "The school district has been contacted by a water well contractor who may provide the water well for crop irrigation and pond filling, but we still need pond liners, aerators and associated equipment for the aquaculture ponds."

The rodeo subcommittee has organized several fundraising activities including the sale of inscribed bricks to be used as pavers in a visitor viewing area along the fence-line of the Longhorn Project.

The Longhorn Project is a joint effort of the Clear Creek Independent School District, JSC and the Houston Livestock Show & Rodeo through its NASA/Clear Creek/Friendswood Metro Go Texan Subcommittee. The first of its kind

facility for high school-level agricultural education continues NASA's mission to work with the educational community to inspire students and create learning opportunities.

The project will allow students to learn about cattle care and breeding, aquaculture, and fruit and vegetable cultivation. The site is a 60-acre tract west of Rocket Park and bounded by Saturn Lane on the south and the Antenna Test Range on the north. The tract will consist of a 35-acre pasture for grazing, a 10-acre wildlife habitat pond, an 8-acre feedlot with a barn and storage shed, and seven acres for aquaculture ponds, gardens, orchards, a processing lab, and a greenhouse.

Through agricultural education, students learn science, mathematics and technology skills that are the cornerstones of expertise that will be needed to run the space program in the future.

## Engineers fan out to area classrooms

(Continued from Page 1)

Lockheed Martin, McDonnell Douglas, Rothe Development, SYSCOM Development and United Space Alliance.

To help prepare volunteers for their classroom presentations, JSC's Education Outreach Program held two orientation meetings in which a panel of experts discussed presentation tips and provided information on access to resources such as exhibits, videos, and promotional materials. Sandy Peck, a certified teacher from JSC's Teaching from Space Program, discussed with volunteers the important link between their unique careers at JSC and the opportunity to interact with students during National Engineers Week.

"You work in tomorrow. But, you will see tomorrow in the school room through the eyes of a young student.

You will hold in the palm of your hand the greatest natural resource this Earth can give, the inquiring mind of a young child or young adult," Peck said.

Rodney Rocha, a veteran volunteer in JSC's Education Outreach Program and Appearances Office, has been visiting classrooms for National Engineers Week since 1991. "Two of my goals are first, to demonstrate by examples the importance of science and engineering not only for application to the quality of life but also for survival in the next century, and second, to emphasize to young minds the importance of developing critical, objective thinking so as to make informed decisions vital to their future," Rocha said.

During his visit to an eighth-grade Earth Science class at Harby Junior High School in Alvin, Rocha dis-

cussed Isaac Newton's laws of motion and gravity which are employed not only by astronomers and physicists, but by NASA engineers involved in the design of space vehicles. "I used an interactive Socratic process in which I also asked students several questions, posed interesting 'thought problems' and their solutions, and emphasized the power of mathematics to investigate nature and the universe," Rocha said. "I used the blackboard quite a lot."

As part of the Discover "E" program, JSC volunteers will visit classrooms to show students how math, science, and engineering create the world around them and introduce them to technical careers.

For more information about how to become a volunteer in the Education Outreach Program, call x32929.

## Space News Roundup

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Editor ..... Kelly Humphries  
Managing Editor ..... Karen Schmidt

## Goldin says planning helps NASA deliver

(Continued from Page 1)

Daniel S. Goldin said new management and planning efforts such as the zero-base review, program management system, and agency/enterprise strategic plans are helping NASA deliver, "faster, better and cheaper programs to meet our customers' needs." He said the NASA Strategic Plan "provides a clear statement of our vision and mission and a road map to the future.... It explains what we will do in the future, for whom and why."

A brochure summarizing the handbook was distributed to all JSC employees this week.

JSC Director George Abbey has instructed JSC supervisors to meet with employees to discuss these management and planning activities and their relationship to JSC work.